

SEQUENCE LISTING

<110> Rafalski, J. Antoni
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 Miao, Guo-Hua

<120> PLANT VITAMIN E BIOSYNTHETIC ENZYMES

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<151> 1998-12-03

<160> 43

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<210> 1

<211> 792

<212> DNA

<213> Zea mays

<400> 1

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<210> 2

<211> 191

<212> PRT

<213> Zea mays

<400> 2

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          20           25           30

Pro Phe Pro Asp Gly Gln Phe Asp Leu Val Trp Ser Met Glu Ser Gly
  35           40           45

Glu His Met Pro Asp Lys Arg Lys Phe Val Ser Glu Leu Ala Arg Val
  50           55           60

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Ala Ala Pro Gly Gly Thr Ile Ile Ile Val Thr Trp Cys His Arg Asn
 65 70 75 80

Leu Asp Pro Ser Glu Thr Ser Leu Lys Pro Asp Glu Leu Ser Leu Leu
 85 90 95

Arg Arg Ile Cys Asp Ala Tyr Tyr Leu Pro Asp Trp Cys Ser Pro Ser
 100 105 110

Asp Tyr Val Asn Ile Ala Lys Ser Leu Ser Leu Glu Asp Ile Lys Thr
 115 120 125

Ala Asp Trp Ser Glu Asn Val Ala Pro Phe Trp Pro Ala Val Ile Lys
 130 135 140

Ser Ala Leu Thr Trp Lys Gly Phe Thr Ser Leu Leu Thr Thr Gly Trp
 145 150 155 160

Lys Thr Ile Arg Gly Ala Met Val Met Pro Leu Met Ile Gln Gly Tyr
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Lys Lys Gly Leu Ile Lys Phe Thr Ile Ile Thr Cys Arg Lys Pro
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 <212> DNA
 <213> Oryza sativa

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 ggggtgatgcc tccggatgat nnaaggntac aaagaaangg gtcaacaaat ttaacaanaa 420
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<210> 4
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 <212> PRT
 <213> Oryza sativa

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Pro Gly Ala Arg Ile Ile Ile Val Thr Trp Cys His Arg Asn Leu Glu
 20 25 30

Pro Ser Glu Glu Ser Leu Lys Pro Asp Glu Leu Asn Leu Leu Lys Arg
 35 40 45

Ile Cys Asp Ala Tyr Tyr Leu Pro Asp Trp Cys Ser Pro Ser Asp Tyr
 50 55 60

Val Lys Ile Ala Glu Ser Leu Ser Leu Glu Asp Ile Arg Thr Ala Asp
 65 70 75 80

Trp Ser

<210> 5
 <211> 592
 <212> DNA
 <213> Oryza sativa

<400> 5
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<210> 6
 <211> 144
 <212> PRT
 <213> Oryza sativa

<400> 6
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 Arg Cys Thr Ser Arg His Leu Cys Ala Ser Ala Ser Pro Arg Ala Gly
 35 40 45
 Leu Cys Leu His His His Arg Arg Arg Arg Arg Ser Ser Arg Arg Thr
 50 55 60
 Lys Leu Ala Val Arg Ala Met Ala Pro Thr Leu Ser Ser Ser Ser Thr
 65 70 75 80
 Ala Ala Ala Ala Pro Pro Gly Leu Lys Glu Gly Ile Ala Gly Leu Tyr
 85 90 95
 Asp Glu Xaa Ser Gly Val Trp Glu Ser Ile Trp Gly Glu His Met His
 100 105 110
 His Gly Phe Tyr Asp Ala Gly Glu Gly Ala Ser Met Ser Asp His Arg
 115 120 125
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<210> 7
 <211> 1331
 <212> DNA
 <213> Glycine max

<400> 7

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aggatgacaa gaagaagctg cagaaggaa tcgcagagtt ttacgacgag tcgtctggct 240
tatgggagaa cttttggggc gaccacatgc accatggctt ttatgactcg gattccactg 300
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<210> 8

<211> 349

<212> PRT

<213> Glycine max

<400> 8

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                20                      25                      30

Pro Arg Ser Trp Ala Pro Ile Arg Ala Ser Ala Ala Ser Ser Glu Arg
        35                      40                      45

Gly Glu Ile Val Leu Glu Gln Lys Pro Lys Lys Asp Asp Lys Lys Lys
    50                      55                      60

Leu Gln Lys Gly Ile Ala Glu Phe Tyr Asp Glu Ser Ser Gly Leu Trp
    65                      70                      75                      80

Glu Asn Ile Trp Gly Asp His Met His His Gly Phe Tyr Asp Ser Asp
        85                      90                      95

Ser Thr Val Ser Leu Ser Asp His Arg Ala Ala Gln Ile Arg Met Ile
        100                      105                      110

Gln Glu Ser Leu Arg Phe Ala Ser Val Ser Glu Glu Arg Ser Lys Trp
        115                      120                      125

Pro Lys Ser Ile Val Asp Val Gly Cys Gly Ile Gly Gly Ser Ser Arg
    130                      135                      140

Tyr Leu Ala Lys Lys Phe Gly Ala Thr Ser Val Gly Ile Thr Leu Ser
    145                      150                      155                      160

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Pro Val Gln Ala Gln Arg Ala Asn Ala Leu Ala Ala Ala Gln Gly Leu
 165 170 175

Ala Asp Lys Val Ser Phe Gln Val Ala Asp Ala Leu Gln Gln Pro Phe
 180 185 190

Ser Asp Gly Gln Phe Asp Leu Val Trp Ser Met Glu Ser Gly Glu His
 195 200 205

Met Pro Asp Lys Ala Lys Phe Val Gly Glu Leu Ala Arg Val Ala Ala
 210 215 220

Pro Gly Ala Ile Ile Ile Ile Val Thr Trp Cys His Arg Asp Leu Gly
 225 230 235 240

Pro Asp Glu Gln Ser Leu His Pro Trp Glu Gln Asp Leu Leu Lys Lys
 245 250 255

Ile Cys Asp Ala Tyr Tyr Leu Pro Ala Trp Cys Ser Thr Ser Asp Tyr
 260 265 270

Val Lys Leu Leu Gln Ser Leu Ser Leu Gln Asp Ile Lys Ser Glu Asp
 275 280 285

Trp Ser Arg Phe Val Ala Pro Phe Trp Pro Ala Val Ile Arg Ser Ala
 290 295 300

Phe Thr Trp Lys Gly Leu Ser Ser Leu Leu Ser Ser Gly Lys Leu Gly
 305 310 315 320

Ile Tyr Ile Ala Phe Gln Lys Gln Thr Pro Pro Ser Ser Ile Ala Thr
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Cys Lys Ser Tyr Val Thr Asp His Tyr Phe His Thr Arg
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<210> 9
 <211> 1011
 <212> DNA
 <213> Triticum aestivum

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 atgttgatg cggaatcggt ggtagctcaa gatacctggg cgaacaaata tggagcacia 240
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<210> 10
 <211> 293
 <212> PRT
 <213> Triticum aestivum

<400> 10
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 Gly Phe Tyr Asp Ser Gly Glu Ala Ala Ser Met Ser Asp His Arg Arg
 20 25 30
 Ala Gln Ile Arg Met Ile Glu Glu Ala Leu Ala Phe Ala Ala Val Pro
 35 40 45
 Asp Asp Pro Thr Asn Lys Pro Lys Thr Ile Val Asp Val Gly Cys Gly
 50 55 60
 Ile Gly Gly Ser Ser Arg Tyr Leu Gly Glu Gln Ile Trp Ser Thr Met
 65 70 75 80
 Leu Trp Asp His Ile Asp Pro Val Gln Ala Glu Arg Gly Asn Ala Leu
 85 90 95
 Ala Ala Ala Gln Gly Val Val Arg Thr Arg Phe Phe Pro Ile Ala Asp
 100 105 110
 Leu Trp Glu Gln Pro Phe Pro Gly Trp Ala Phe Asp Leu Val Xaa Xaa
 115 120 125
 Xaa Xaa Xaa Xaa Xaa His Met Pro Asn Lys Gln Lys Phe Val Ser Glu
 130 135 140
 Leu Ala Arg Val Ala Ala Pro Gly Ala Thr Ile Ile Ile Val Thr Trp
 145 150 155 160
 Cys His Arg Asn Leu Ala Pro Ser Glu Asp Ser Leu Lys Pro Asp Glu
 165 170 175
 Leu Asn Leu Leu Lys Lys Ile Cys Asp Ala Tyr Tyr Leu Pro Asp Trp
 180 185 190
 Cys Ser Pro Ser Asp Tyr Val Lys Ile Ala Glu Ser Leu Ser Leu Glu
 195 200 205
 Asp Ile Lys Thr Ala Asp Trp Ser Glu Asn Val Ala Pro Phe Trp Pro
 210 215 220
 Ala Val Ile Gln Ser Ala Leu Thr Trp Lys Gly Leu Thr Ser Leu Leu
 225 230 235 240
 Arg Ser Gly Trp Lys Thr Ile Lys Gly Ala Leu Val Met Pro Leu Met
 245 250 255
 Ile Gln Gly Tyr Lys Lys Gly Leu Ile Lys Phe Lys His His His Leu
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 Pro Gln Thr Pro Ser Ser His Arg Arg Arg Thr Trp Arg Pro His Arg
 275 280 285

Pro Arg Val Val Glu
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<210> 11
<211> 432
<212> DNA
<213> Oryza sativa

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cgtcggcgcg gacgcggcca ccaccgcctc cctcccttc ttctccctt cctttctccc 240
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<210> 12
<211> 75
<212> PRT
<213> Oryza sativa

<400> 12
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Gly Asn Ser Ala His Ala Ser Leu Leu Arg Ser Ala Ser Val Ala
35 40 45
Phe Leu Phe Thr Ala Pro Tyr Gly Gly Asp His Gly Val Gly Ala Asp
50 55 60
Ala Ala Thr Thr Ala Ser Ile Pro Ser Phe Ser
65 70 75

<210> 13
<211> 628
<212> DNA
<213> Oryza sativa

<400> 13
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<210> 14
<211> 123

<212> PRT

<213> Oryza sativa

<400> 14

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Ala Pro Val Ala Ala Tyr Ile Ser Gly Phe Thr Gly Phe His Glu Phe
 20 25 30

Ala Glu Phe Thr Ala Glu Asp Val Gly Thr Ala Glu Ser Gly Leu Asn
 35 40 45

Ser Val Val Leu Ala Asn Asn Ala Glu Thr Val Leu Leu Pro Leu Asn
 50 55 60

Glu Pro Val His Gly Thr Lys Arg Arg Ser Gln Ile Gln Thr Tyr Leu
 65 70 75 80

Asp His His Gly Gly Pro Gly Val Gln His Ile Ala Leu Ala Ser Asp
 85 90 95

Asp Val Leu Gly Thr Leu Xaa Glu Met Pro Gly Ala Ser Ala Trp Ala
 100 105 110

Val Arg Phe Leu Gly Pro Pro Pro Pro Thr Thr
 115 120

<210> 15

<211> 1027

<212> DNA

<213> Glycine max

<400> 15

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<210> 16

<211> 276

<212> PRT

<213> Glycine max

<400> 16

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 20 25 30

Arg Thr Asn Pro Lys Ser Asp Arg Phe Gln Val Asn Arg Phe His His
 35 40 45

Ile Glu Phe Trp Cys Thr Asp Ala Thr Asn Ala Ser Arg Arg Phe Ser
 50 55 60

Trp Gly Leu Gly Met Pro Ile Val Ala Lys Ser Asp Leu Ser Thr Gly
 65 70 75 80

Asn Gln Ile His Ala Ser Tyr Leu Leu Arg Ser Gly Asp Leu Ser Phe
 85 90 95

Leu Phe Ser Ala Pro Tyr Ser Pro Ser Leu Ser Ala Gly Ser Ser Ala
 100 105 110

Ala Ser Ser Ala Ser Ile Pro Ser Phe Asp Ala Ala Thr Cys Leu Ala
 115 120 125

Phe Ala Ala Lys His Gly Phe Gly Val Arg Ala Ile Ala Leu Glu Val
 130 135 140

Ala Asp Ala Glu Ala Ala Phe Ser Ala Ser Val Ala Lys Gly Ala Glu
 145 150 155 160

Pro Ala Ser Pro Pro Val Leu Val Asp Asp Arg Thr Gly Phe Ala Glu
 165 170 175

Val Arg Leu Tyr Gly Asp Val Val Leu Arg Tyr Val Ser Tyr Lys Asp
 180 185 190

Ala Ala Pro Gln Ala Pro His Ala Asp Xaa Ser Arg Trp Phe Leu Pro
 195 200 205

Gly Phe Glu Ala Ala Ala Ser Ser Ser Ser Phe Pro Glu Leu Asp Tyr
 210 215 220

Gly Ile Arg Arg Leu Asp His Ala Val Gly Asn Val Pro Glu Leu Ala
 225 230 235 240

Pro Ala Val Arg Tyr Leu Lys Gly Phe Ser Gly Phe His Glu Phe Ala
 245 250 255

Glu Phe Thr Ala Glu Asp Val Gly Thr Ser Glu Ser Gly Leu Asn Ser
 260 265 270

Val Val Leu Ala
 275

<210> 17

<211> 511

<212> DNA

<213> *Vernonia mesipifolia*

<400> 17
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 ccggtgtacg gaanaaaagg aagagccaga t 511

<210> 18
 <211> 170
 <212> PRT
 <213> *Vernonia mesipifolia*

<400> 18
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 20 25 30
 Val Ser His Gly Ala Lys Pro Ser Ala Ala Pro Val Thr Leu Gly Asn
 35 40 45
 Asn Asp Val Val Leu Ser Glu Val Lys Leu Tyr Gly Asp Val Ala Phe
 50 55 60
 Arg Tyr Ile Ser Tyr Lys Asn Pro Asn Tyr Thr Ser Ser Phe Leu Pro
 65 70 75 80
 Gly Phe Glu Pro Val Glu Lys Thr Ser Ser Phe Tyr Asp Leu Asp Tyr
 85 90 95
 Gly Ile Arg Arg Leu Asp His Ala Val Gly Asn Val Pro Glu Leu Ala
 100 105 110
 Ser Ala Val Asp Tyr Val Lys Ser Phe Thr Gly Phe His Glu Phe Ala
 115 120 125
 Glu Phe Thr Ala Glu Asp Val Gly Thr Ser Glu Arg Glu Leu Asn Ser
 130 135 140
 Val Val Leu Ala Cys Asn Ser Glu Met Val Leu Ile Pro Met Asn Glu
 145 150 155 160
 Pro Val Tyr Gly Xaa Lys Gly Arg Ala Arg
 165 170

<210> 19
 <211> 1165
 <212> DNA
 <213> *Triticum aestivum*

<400> 19
 caagaagcga acacacacca tgccgcccac cccaccacc cccgcagcca ccggcgccgc 60
 cgcggtgacg ccggagcacg cgcgcccgcg ccgaatggc cgcttcaacc cgcgcagcga 120
 ccgcttccac acgctcgct tccaccacgt cgagttctgg tgcgcggacg ccgcctccgc 180
 cgccggccgc ttcgccttcg cgctcggcgc gccgtcgcc gccaggtccg acctctccac 240

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gctctcggag gcgcaaatna agaatgcaa gaactggggg tgctcntcca caaggaagaa 1080
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<210> 20

<211> 179

<212> PRT

<213> Triticum aestivum

<400> 20

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Met Pro Pro Thr Pro Thr Thr Pro Ala Ala Thr Gly Ala Ala Ala Val
  1           5           10           15

```

```

Thr Pro Glu His Ala Arg Pro Arg Arg Met Val Arg Phe Asn Pro Arg
          20           25           30

```

```

Ser Asp Arg Phe His Thr Leu Ala Phe His His Val Glu Phe Trp Cys
          35           40           45

```

```

Ala Asp Ala Ala Ser Ala Ala Gly Arg Phe Ala Phe Ala Leu Gly Ala
          50           55           60

```

```

Pro Leu Ala Ala Arg Ser Asp Leu Ser Thr Gly Asn Ser Val His Ala
          65           70           75           80

```

```

Ser Gln Leu Leu Arg Ser Gly Asn Leu Ala Phe Leu Phe Thr Ala Pro
          85           90           95

```

```

Tyr Ala Asn Gly Cys Asp Ala Ala Thr Ala Ser Leu Pro Ser Phe Ser
          100          105          110

```

```

Ala Asp Ala Ala Arg Arg Phe Ser Ala Asp His Gly Leu Ala Val Arg
          115          120          125

```

```

Ser Ile Ala Leu Arg Val Ala Asp Ala Ala Glu Ala Phe Arg Ala Ser
          130          135          140

```

```

Val Asp Gly Gly Ala Arg Pro Ala Phe Ser Pro Val Asp Leu Gly Arg
          145          150          155          160

```

```

Gly Phe Gly Phe Ala Glu Val Glu Leu Tyr Gly Asp Val Val Leu Arg
          165          170          175

```

Phe Val Ser

<210> 21
 <211> 1102
 <212> DNA
 <213> Zea mays

<220>
 <221> unsure
 <222> (454)

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<220>
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 <222> (1100)

<400> 21
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 gccgtcgctca gcctgcgtcc gatggcctcg tcgacggctc agggccccgc gacggcgccg 180
 ccgggtctga aggagggcat cgcggggctg tacgacgagt cgtcggggct gtgggagaac 240
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 gatcaccgcc gcgcccagat ccgcatgata gaggaggcgc tcgccttcgc cgggtgtcca 360
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<210> 22
 <211> 352
 <212> PRT
 <213> Zea mays

<220>
 <221> UNSURE
 <222> (152)

<400> 22
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Ala Ala Cys Arg Arg Gly Ser His Tyr Arg Ala Pro Ser His Val Pro
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 Arg His Ser Arg Arg Leu Arg Arg Ala Val Val Ser Leu Arg Pro Met
 35 40 45
 Ala Ser Ser Thr Ala Gln Ala Pro Ala Thr Ala Pro Pro Gly Leu Lys
 50 55 60
 Glu Gly Ile Ala Gly Leu Tyr Asp Glu Ser Ser Gly Leu Trp Glu Asn
 65 70 75 80
 Ile Trp Gly Asp His Met His His Gly Phe Tyr Asp Ser Ser Glu Ala
 85 90 95
 Ala Ser Met Ala Asp His Arg Arg Ala Gln Ile Arg Met Ile Glu Glu
 100 105 110
 Ala Leu Ala Phe Ala Gly Val Pro Ala Ser Asp Asp Pro Glu Lys Thr
 115 120 125
 Pro Lys Thr Ile Val Asp Val Gly Cys Gly Ile Gly Gly Ser Ser Arg
 130 135 140
 Tyr Leu Ala Lys Lys Tyr Gly Xaa Gln Cys Thr Gly Ile Thr Leu Ser
 145 150 155 160
 Pro Val Gln Ala Glu Arg Gly Asn Ala Leu Ala Ala Ala Gln Gly Leu
 165 170 175
 Ser Asp Gln Val Thr Leu Gln Val Ala Asp Ala Leu Glu Gln Pro Phe
 180 185 190
 Pro Asp Gly Gln Phe Asp Leu Val Trp Ser Met Glu Ser Gly Glu His
 195 200 205
 Met Pro Asp Lys Arg Lys Phe Val Ser Glu Leu Ala Arg Val Ala Ala
 210 215 220
 Pro Gly Gly Thr Ile Ile Ile Val Thr Trp Cys His Arg Asn Leu Asp
 225 230 235 240
 Pro Ser Glu Thr Ser Leu Lys Pro Asp Glu Leu Ser Leu Leu Arg Arg
 245 250 255
 Ile Cys Asp Ala Tyr Tyr Leu Pro Asp Trp Cys Ser Pro Ser Asp Tyr
 260 265 270
 Val Asn Ile Ala Lys Ser Leu Ser Leu Glu Asp Ile Lys Thr Ala Asp
 275 280 285
 Trp Ser Glu Asn Val Ala Pro Phe Trp Pro Ala Val Ile Lys Ser Ala
 290 295 300
 Leu Thr Trp Lys Gly Phe Thr Ser Leu Leu Thr Thr Gly Trp Lys Thr
 305 310 315 320
 Ile Arg Gly Ala Met Val Met Pro Leu Met Ile Gln Gly Tyr Lys Lys
 325 330 335

Gly Leu Ile Lys Phe Thr Ile Ile Thr Cys Arg Lys Pro Gly Ala Ala
340 345 350

<210> 23
<211> 521
<212> DNA
<213> Oryza sativa

<220>
<221> unsure
<222> (269)

<220>
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<220>
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 <222> (514)

<400> 23
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 gatgagctga atctcctgaa aaggatatgc gatgcatatt atctcccaga ctggtgctct 180
 ccttctgatt atgtcaaaat tgccgagtcg ctgtctcttg aggatataag gacagctgat 240
 tgggtcaagag aacgtcgccc caatccggnc tgcnggttat taaatnaagc aattgacatg 300
 gnaagggtta actttctcct ggctaagaan tgggtgggaa gacgattaag aaggtggaat 360
 gggatgatgcc tccggatgat nnaaggntac aaagaaangg gtcaacaaat ttaacaanaa 420
 caacctgtnc caaagncccg aaacaacgca ataatacccc antaatnaaa ttncgctcct 480
 ggctaacctt ctccaacaac gaattaatgg aaanttctga c 521

<210> 24
 <211> 172
 <212> PRT
 <213> Oryza sativa

<400> 24
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 1 5 10 15
 Asp Leu Val Trp Ser Met Glu Ser Asp Glu His Met Pro Asp Lys Arg
 20 25 30
 Gln Phe Val Ser Glu Leu Ala Arg Val Ala Ala Pro Gly Ala Arg Ile
 35 40 45
 Ile Ile Val Thr Trp Cys His Arg Asn Leu Glu Pro Ser Glu Glu Ser
 50 55 60
 Leu Lys Pro Asp Glu Leu Asn Leu Leu Lys Arg Ile Cys Asp Ala Tyr
 65 70 75 80
 Tyr Leu Pro Asp Trp Cys Ser Pro Ser Asp Tyr Val Lys Ile Ala Glu
 85 90 95
 Ser Leu Ser Leu Glu Asp Ile Arg Thr Ala Asp Trp Ser Glu Asn Val
 100 105 110
 Ala Pro Phe Trp Pro Ala Val Ile Lys Ser Ala Leu Thr Trp Lys Gly
 115 120 125
 Leu Thr Ser Leu Leu Arg Ser Gly Trp Glu Thr Val Arg Gly Ala Met
 130 135 140
 Val Met Pro Leu Val Ile Glu Gly Tyr Lys Lys Gly Leu Ile Lys Phe
 145 150 155 160
 Pro Ile Ile Thr Cys Arg Lys Pro Glu Thr Thr Gln
 165 170

<210> 25
 <211> 464

<212> DNA

<213> Oryza sativa

<400> 25

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cgccgcccga gcagccggag gacgaaactc gccgtgcgcg cgatggcacc gacgttgctc 180
tcgtcgtcga cggcgggcgc agctcccccg gggctgaagg agggcatcgc ggggctctac 240
gacgagtcgt ccggcgtgtg ggagagcatc tggggcgagc acatgcacca cggcttctac 300
gacgcccggc aggcgcctc catgtccgac caccgcccgc cccagatccg catgatcgag 360
gaatccctcg ccttcgccgc cgttccccga tgatgcgggt aacaaaccca aaagtgttat 420
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```

<210> 26

<211> 128

<212> PRT

<213> Oryza sativa

<400> 26

```

Ala Arg Val Gln Pro Thr Gly Ala Leu Ala Pro Leu His Pro Leu Leu
  1           5           10           15

```

```

Arg Cys Thr Ser Arg His Leu Cys Ala Ser Ala Ser Pro Arg Ala Gly
          20           25           30

```

```

Leu Cys Leu His His His Arg Arg Arg Arg Arg Ser Ser Arg Arg Thr
          35           40           45

```

```

Lys Leu Ala Val Arg Ala Met Ala Pro Thr Leu Ser Ser Ser Ser Thr
          50           55           60

```

```

Ala Ala Ala Ala Pro Pro Gly Leu Lys Glu Gly Ile Ala Gly Leu Tyr
          65           70           75           80

```

```

Asp Glu Ser Ser Gly Val Trp Glu Ser Ile Trp Gly Glu His Met His
          85           90           95

```

```

His Gly Phe Tyr Asp Ala Gly Glu Ala Ala Ser Met Ser Asp His Arg
          100          105          110

```

```

Arg Ala Gln Ile Arg Met Ile Glu Ser Leu Ala Phe Ala Ala Val
          115          120          125

```

<210> 27

<211> 1189

<212> DNA

<213> Glycine max

<400> 27

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ttcccaatcc cctcgcaatt tcgccagaat ccgggtcgga cccaggtcgt gggctcctat 120
tcgggcatcg gcagcgagct cggagagagg ggagatagta ttggagcaga agccgaagaa 180
ggatgacaag aagaagctgc agaagggaat cgcagagttt tacgacgagt cgtctggctt 240
atgggagaac atttggggcg accacatgca ccatggcttt tatgactcgg attccactgt 300
ttcgctttcg gatcatcgtg ctgctcagat ccgaatgata caagagtctc ttcgctttgc 360
ctctgtttct gaggagcgta gtaaatggcc caagagtata gttgatgttg ggtgtggcat 420
aggtggcagc tctagatacc tggccaagaa atttgagca accagtgtag gcatcactct 480
gagtcctgtt caagctcaaa gagcaaatgc tcttgctgct gctcaaggat tggctgataa 540
ggtttccttt caggttgctg acgctctaca gcaaccattc tctgacggcc agtttgatct 600
ggtgtggtcc atggagagtg gagagcatat gcctgacaaa gctaagtttg ttggagagtt 660

```



```

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tgccctgac gaacaatcct tacatccatg ggagcaagat ctcttaaaga agatttgcga 780
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taagtttggc atcattacat gtcgaaaacc tgaataaatg gagaggcagg attactttta 1080
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<210> 28

<211> 350

<212> PRT

<213> Glycine max

<400> 28

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Met Ala Thr Val Val Arg Ile Pro Thr Ile Ser Cys Ile His Ile His
  1             5             10             15

```

```

Thr Phe Arg Ser Gln Ser Pro Arg Thr Phe Ala Arg Ile Arg Val Gly
          20             25             30

```

```

Pro Arg Ser Trp Ala Pro Ile Arg Ala Ser Ala Ala Ser Ser Glu Arg
      35             40             45

```

```

Gly Glu Ile Val Leu Glu Gln Lys Pro Lys Lys Asp Asp Lys Lys Lys
  50             55             60

```

```

Leu Gln Lys Gly Ile Ala Glu Phe Tyr Asp Glu Ser Ser Gly Leu Trp
  65             70             75             80

```

```

Glu Asn Ile Trp Gly Asp His Met His His Gly Phe Tyr Asp Ser Asp
          85             90             95

```

```

Ser Thr Val Ser Leu Ser Asp His Arg Ala Ala Gln Ile Arg Met Ile
      100             105             110

```

```

Gln Glu Ser Leu Arg Phe Ala Ser Val Ser Glu Glu Arg Ser Lys Trp
      115             120             125

```

```

Pro Lys Ser Ile Val Asp Val Gly Cys Gly Ile Gly Gly Ser Ser Arg
      130             135             140

```

```

Tyr Leu Ala Lys Lys Phe Gly Ala Thr Ser Val Gly Ile Thr Leu Ser
      145             150             155             160

```

```

Pro Val Gln Ala Gln Arg Ala Asn Ala Leu Ala Ala Ala Gln Gly Leu
          165             170             175

```

```

Ala Asp Lys Val Ser Phe Gln Val Ala Asp Ala Leu Gln Gln Pro Phe
      180             185             190

```

```

Ser Asp Gly Gln Phe Asp Leu Val Trp Ser Met Glu Ser Gly Glu His
      195             200             205

```

```

Met Pro Asp Lys Ala Lys Phe Val Gly Glu Leu Ala Arg Val Ala Ala
      210             215             220

```

```

Pro Gly Ala Ile Ile Ile Ile Val Thr Trp Cys His Arg Asp Leu Gly
      225             230             235             240

```

Pro Asp Glu Gln Ser Leu His Pro Trp Glu Gln Asp Leu Leu Lys Lys
 245 250 255

Ile Cys Asp Ala Tyr Tyr Leu Pro Ala Trp Cys Ser Thr Ser Asp Tyr
 260 265 270

Val Lys Leu Leu Gln Ser Leu Ser Leu Gln Asp Ile Lys Ser Glu Asp
 275 280 285

Trp Ser Arg Phe Val Ala Pro Phe Trp Pro Ala Val Ile Arg Ser Ala
 290 295 300

Phe Thr Trp Lys Gly Leu Ser Ser Leu Leu Ser Ser Gly Gln Lys Thr
 305 310 315 320

Ile Lys Gly Ala Leu Ala Met Pro Leu Met Ile Glu Gly Tyr Lys Lys
 325 330 335

Asp Leu Ile Lys Phe Ala Ile Ile Thr Cys Arg Lys Pro Glu
 340 345 350

<210> 29
 <211> 1257
 <212> DNA
 <213> Triticum aestivum

<220>
 <221> unsure
 <222> (31)

<220>
 <221> unsure
 <222> (151)

<400> 29

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ggcctgtcct	gccgctcctc	ccggccagac	ngctccgtgc	gcccgatggc	gtcgtcgacg	180
accgcggccc	gggcgacgcg	gcgcgcgcgg	ggctgaagga	gggcatcgcg	gggctctacg	240
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actccggcga	ggccgcctcc	atgtccgacc	accgcccgcg	ccagatccgc	atgatcgagg	360
aggccctcgc	cttcgcccgc	gtccccgacg	atccgacaaa	caaaccctaa	acgattgttg	420
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taaggagtgg	atggaagacg	ataaaggagg	cactgggtgat	gcctctcatg	atccaaggct	1020
acaagaaagg	cctcattaag	ttcagcatca	tcaacctgccg	caaaccctaa	gcagccatag	1080
aaggagaacc	tgaggccgca	tcgcccagtg	tagaatagaa	cccatgtgat	tggaatagac	1140
tcggcttgct	gtcgccctcgt	agctgaataa	ttttgtgtta	ccgtgcctct	ctatctgcaa	1200
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<210> 30
 <211> 366

<212> PRT
 <213> Triticum aestivum

<220>
 <221> UNSURE
 <222> (5)

<220>
 <221> UNSURE
 <222> (45)

<400> 30

Met Ala Asn Ser Xaa Arg Pro Ala Pro Leu Thr Pro Leu His Arg Leu
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Asp Ala Ala Pro Pro Pro Arg Pro Ser Leu Gly His Ala Ala Arg Pro
 20 25 30

Val Pro Arg Pro Val Leu Pro Leu Leu Pro Ala Arg Xaa Leu Arg Ala
 35 40 45

Pro Asp Gly Val Val Asp Asp Arg Gly Pro Gly Asp Ala Ala Pro Pro
 50 55 60

Gly Leu Lys Glu Gly Ile Ala Gly Leu Tyr Asp Glu Ser Ser Gly Leu
 65 70 75 80

Trp Glu Ser Ile Trp Gly Glu His Met His His Gly Phe Tyr Asp Ser
 85 90 95

Gly Glu Ala Ala Ser Met Ser Asp His Arg Arg Ala Gln Ile Arg Met
 100 105 110

Ile Glu Glu Ala Leu Ala Phe Ala Ala Val Pro Asp Asp Pro Thr Asn
 115 120 125

Lys Pro Lys Thr Ile Val Asp Val Gly Cys Gly Ile Gly Gly Ser Ser
 130 135 140

Arg Tyr Leu Ala Asn Lys Tyr Gly Ala Gln Cys Ser Gly Ile Thr Leu
 145 150 155 160

Ser Pro Val Gln Ala Glu Arg Gly Asn Ala Leu Ala Ala Ala Gln Gly
 165 170 175

Leu Ser Asp Lys Ala Ser Phe Gln Val Ala Asp Ala Leu Glu Gln Pro
 180 185 190

Phe Pro Asp Gly Gln Phe Asp Leu Val Trp Ser Met Glu Ser Gly Glu
 195 200 205

His Met Pro Asn Lys Gln Lys Phe Val Ser Glu Leu Ala Arg Val Ala
 210 215 220

Ala Pro Gly Ala Thr Ile Ile Ile Val Thr Trp Cys His Arg Asn Leu
 225 230 235 240

Ala Pro Ser Glu Asp Ser Leu Lys Pro Asp Glu Leu Asn Leu Leu Lys
 245 250 255

Lys Ile Cys Asp Ala Tyr Tyr Leu Pro Asp Trp Cys Ser Pro Ser Asp
 260 265 270
 Tyr Val Lys Ile Ala Glu Ser Leu Ser Leu Glu Asp Ile Lys Thr Ala
 275 280 285
 Asp Trp Ser Glu Asn Val Ala Pro Phe Trp Pro Ala Val Ile Gln Ser
 290 295 300
 Ala Leu Thr Trp Lys Gly Leu Thr Ser Leu Leu Arg Ser Gly Trp Lys
 305 310 315 320
 Thr Ile Lys Gly Ala Leu Val Met Pro Leu Met Ile Gln Gly Tyr Lys
 325 330 335
 Lys Gly Leu Ile Lys Phe Ser Ile Ile Thr Cys Arg Lys Pro Gln Ala
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 Ala Ile Glu Gly Glu Pro Glu Ala Ala Ser Pro Ser Val Glu
 355 360 365

<210> 31
 <211> 1605
 <212> DNA
 <213> Catalpa sp.

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 caagctgggtg ggcttcaaga atttcgtcag gaccaacccc aagtcgcgacc acttctgcgt 240
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 caagaacaga gctggagatg tgctgaggga tgagcagatt gaggagtgtg agaagttggg 1200
 gatcttgggt gacagggatg atcaggggac tttgcttcag attttcacca agcctgtggg 1260
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 agcgtcggcc tgagttctga gtccttccta ctgtgttgta gatattgtga tgaaccaatg 1500
 tccgtgcggg acatagggtg ttcttatgct gtactaaact gtagttgaca agaagtttta 1560
 cttaataata tatcgtactt tctataaaaa aaaaaaaaaa aaaaa 1605

<210> 32
 <211> 445
 <212> PRT
 <213> Catalpa sp.

<400> 32

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Met Gly Lys Gln Thr Thr Thr Ser Ala Thr Ala Ala Asp Gly Ser Lys
 1           5           10           15

Asp Ala His Ala Glu Phe Lys Leu Val Gly Phe Lys Asn Phe Val Arg
      20           25           30

Thr Asn Pro Lys Ser Asp His Phe Cys Val His Arg Phe His His Ile
      35           40           45

Glu Phe Trp Cys Gly Asp Ala Thr Asn Thr Ala Lys Arg Phe Ser Trp
      50           55           60

Gly Leu Gly Met Pro Leu Val Ala Lys Ser Asp Leu Ser Thr Gly Asn
      65           70           75           80

Ser Ala His Ala Ser Tyr Leu Leu Arg Ser Gly Glu Leu Asn Phe Leu
      85           90           95

Phe Thr Ser Pro Tyr Ser Pro Ser Ile Ser Ala Pro Ser Ser Ala Ala
      100          105          110

Ile Pro Ser Phe Ser Phe Ser Thr Tyr Gln Ser Phe Thr Ser Ser His
      115          120          125

Gly Leu Ala Val Arg Ala Val Ala Ile Gln Val Asp Ser Ala Phe Ser
      130          135          140

Ala Tyr Ser Ala Ser Ile Ser Arg Gly Ala Lys Pro Val Ser Ala Pro
      145          150          155          160

Ile Leu Leu Ser Asp Asn Lys Thr Ala Ile Ala Glu Val His Leu Tyr
      165          170          175

Gly Asp Ser Val Leu Arg Phe Val Ser Tyr Gly Asp Asn Gly Thr Gly
      180          185          190

Pro Asp Gly Trp Phe Leu Pro Gly Phe Glu Pro Val Asp Asp Gln Met
      195          200          205

Ser Tyr Lys Glu Leu Asp Tyr Gly Ile Arg Arg Leu Asp His Ala Val
      210          215          220

Gly Asn Val Pro Glu Leu Gly Pro Val Val Asp Tyr Leu Lys Lys Phe
      225          230          235          240

Thr Gly Phe His Glu Phe Ala Glu Phe Thr Ser Glu Asp Val Gly Thr
      245          250          255

Ala Glu Ser Gly Leu Asn Ser Met Val Leu Ala Asn Asn Asn Glu Asn
      260          265          270

Val Leu Leu Pro Leu Asn Glu Pro Val Phe Gly Thr Lys Arg Lys Ser
      275          280          285

Gln Ile Gln Thr Tyr Leu Glu His Asn Glu Gly Pro Gly Val Gln His
      290          295          300

Leu Ala Leu Val Ser Glu Asp Ile Phe Asn Thr Leu Arg Glu Met Arg
      305          310          315          320

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Lys Arg Ser Gly Val Gly Gly Phe Glu Phe Met Pro Ser Pro Pro Leu
 325 330 335
 Thr Tyr Tyr Lys Asn Leu Lys Asn Arg Ala Gly Asp Val Leu Arg Asp
 340 345 350
 Glu Gln Ile Glu Glu Cys Glu Lys Leu Gly Ile Leu Val Asp Arg Asp
 355 360 365
 Asp Gln Gly Thr Leu Leu Gln Ile Phe Thr Lys Pro Val Gly Asp Arg
 370 375 380
 Pro Thr Leu Phe Ile Glu Ile Ile Gln Arg Ile Gly Cys Met Leu Lys
 385 390 395 400
 Asp Glu Gln Gly Lys Leu Tyr Gln Lys Ser Gly Cys Gly Gly Phe Gly
 405 410 415
 Lys Gly Asn Phe Ser Glu Leu Phe Lys Ser Ile Glu Glu Tyr Glu Lys
 420 425 430
 Met Leu Glu Ala Lys Gln Val Thr Glu Thr Ala Ser Ala
 435 440 445

<210> 33
 <211> 1106
 <212> DNA
 <213> Oryza sativa

<400> 33
 gcacgaggaa gagctacggc ctccgccggt tgcaccacgt cgtcggcaac gtgccggagc 60
 tcgctccggt agccgcgtac atctccgggt tcaccgggtt ccacgagttc gccgagttca 120
 ccgccgagga cgtgggcacc gccgagagcg gcctcaactc ggtggtgctc gccacaacg 180
 cggagaccgt gctgctgccg ctcaacgagc cggcgcacgg caccaagcgg cggagccaga 240
 tacagacgta cctggaccac cacggcggcc cgggggtgca gcacatcgcg ctggccagcg 300
 acgacgtgct cgggacgctg agggagatgc gggcgcgctc cgccatgggc ggcttcgagt 360
 tcttggcgcc gccgcgcc aactactacg acggcgtgcg gcggcgcgcc ggggacgtgc 420
 tctcggagga gcagatcaac gagggccagg agctcggggt gctcgtggac agggatgacc 480
 agggggtggt gctccagatc ttcaccaagc cagtaggaga caggccaacc ttttcttg 540
 agatgataca aaggattggg tgcattggga aggatgagag tgggcaggag taccagaagg 600
 gcggctgcgg cgggtttggg aagggcaact tctcggagct gttcaagtcc attgaggagt 660
 atgagaaatc ccttgaagcc aagcaagccc ctacagttca aggatcctag gtaggaactg 720
 gaggcctgga gcaacagatg taaccagtgt atttgtatta tggagcagaa gaaaaaagat 780
 gtgctttcac tgctttgtga tatgtgtcat gcaagtgtat gttgtaattt gtggaagctg 840
 aagacaaatg atggtacaat cactgtataa gataatagac atggatcaca tacaagaatg 900
 taacctagtg ttggcattgc tgctgtacaa tcttgcttgg aaataaaata ataataacc 960
 tggagaaaga atgtaacctg ctgttgccat tgctgatgta caatcttttt ttggaaataa 1020
 aataagaatc cccccaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa 1080
 aaaaaaaaaa aaaaaa aaaaaa aaaaaa aaaaaa aaaaaa 1106

<210> 34
 <211> 235
 <212> PRT
 <213> Oryza sativa

<400> 34
 Thr Arg Lys Ser Tyr Gly Leu Arg Arg Phe Asp His Val Val Gly Asn
 1 5 10 15

Val Pro Glu Leu Ala Pro Val Ala Ala Tyr Ile Ser Gly Phe Thr Gly
 20 25 30

Phe His Glu Phe Ala Glu Phe Thr Ala Glu Asp Val Gly Thr Ala Glu
 35 40 45

Ser Gly Leu Asn Ser Val Val Leu Ala Asn Asn Ala Glu Thr Val Leu
 50 55 60

Leu Pro Leu Asn Glu Pro Val His Gly Thr Lys Arg Arg Ser Gln Ile
 65 70 75 80

Gln Thr Tyr Leu Asp His His Gly Gly Pro Gly Val Gln His Ile Ala
 85 90 95

Leu Ala Ser Asp Asp Val Leu Gly Thr Leu Arg Glu Met Arg Ala Arg
 100 105 110

Ser Ala Met Gly Gly Phe Glu Phe Leu Ala Pro Pro Pro Pro Asn Tyr
 115 120 125

Tyr Asp Gly Val Arg Arg Arg Ala Gly Asp Val Leu Ser Glu Glu Gln
 130 135 140

Ile Asn Glu Cys Gln Glu Leu Gly Val Leu Val Asp Arg Asp Asp Gln
 145 150 155 160

Gly Val Leu Leu Gln Ile Phe Thr Lys Pro Val Gly Asp Arg Pro Thr
 165 170 175

Phe Phe Leu Glu Met Ile Gln Arg Ile Gly Cys Met Glu Lys Asp Glu
 180 185 190

Ser Gly Gln Glu Tyr Gln Lys Gly Gly Cys Gly Gly Phe Gly Lys Gly
 195 200 205

Asn Phe Ser Glu Leu Phe Lys Ser Ile Glu Glu Tyr Glu Lys Ser Leu
 210 215 220

Glu Ala Lys Gln Ala Pro Thr Val Gln Gly Ser
 225 230 235

<210> 35

<211> 1550

<212> DNA

<213> Glycine max

<400> 35

tcacaccaca	ccaatgccaa	tacccatgtg	caacgaaatt	caagcccaag	cccaagccca	60
agcccaagcc	caacctgggt	ttaagctcgt	cggtttcaaa	aacttcgtcc	gaaccaatcc	120
taagtcggac	cgttttcaag	tcaaccgctt	ccaccacatc	gagttctggt	gcaccgatgc	180
caccaacgcc	tctcgccgat	tctcttgggg	acttggaatg	cctattgtgg	caaaatctga	240
tctctccacc	ggaaaccaa	tccacgcctc	ctacctctc	cgtccggcg	acctctcctt	300
ctctttctcc	gtctcttact	ctccctctct	ctccgcggcg	tctccgctg	cctcctccgc	360
ctccattccc	agtttcgacg	ccgccacctg	ccttgccctc	gctgccaaac	acggcttcgg	420
cgtccgcgcc	atcgcccttg	aagtcgccga	cgcggaagcc	gctttcagcg	ccagcgtcgc	480
gaaaggagcc	gagccggcgt	cgccgcgggt	tctcgtcgac	gatcgaccgc	gcttcgcgga	540
ggtgcgcctc	tacggcgacg	tggtgctccg	ctacgtcagc	tacaaggacg	ccgcgccgca	600
ggcgccacac	gcagatccgt	cgcggtgggt	cctgcgggga	ttcgaggccg	cggcgtcgtc	660
gtcttcgttt	ccggagctgg	actacgggat	ccggcggtcg	gaccacgccg	tcgggaacgt	720

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tccggagctg ggcgcggcgg tgaggtacct gaaaggcttc agcggattcc acgagttcgc 780
ggagttcacc gcggaggacg tgggaacgag cgagagcggg ttgaactcgg tggttctggc 840
gaacaactcg gagacggtgt tgctgccgct gaacgagccg gtttacggaa cgaagaggaa 900
gagccagatt gagacgtatt tggaacacaa cgaaggtgct ggtgtgcagc accttgcgct 960
tgttactcac gacatcttca ccacactgag agagatgaga aagcgaagtt tccttggtgg 1020
at ttgagttc atgccttctc ctccctccac ctattacgcc aacctccaca accgtgccgc 1080
tgatgtgttg accgttgacc agattaagca gtgtgaggag cttgggattc ttgttgacag 1140
agatgatcag ggcactctgc ttcagatttt caccaagcct gttggggaca ggccaacgat 1200
attcatagag ataattcaga ggatcgggtg catggtggag gatgaggaag ggaaggtgta 1260
ccagaagggt gcatgtgggg gttttgggaa aggcaatttt tctgagcttt tcaaattccat 1320
tgaagaatat gagaagactt tggaagctaa aagaaccgcg taagcacatt ggaagaacac 1380
aaatactcct ttgttgaaat gattaatgag gaatcaatgt ggcatagggt gtttatactc 1440
tataatacat agaattacaa tgatagtgtc ctcccttgta tgaaaatgaa atcacagaaa 1500
cttttatgga tagtatTTTT ctattaaaaa aaaaaaaaaa aaaaaaaaaa 1550

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<210> 36
 <211> 449
 <212> PRT
 <213> Glycine max

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<400> 36
Met Pro Ile Pro Met Cys Asn Glu Ile Gln Ala Gln Ala Gln Ala Gln
 1             5             10             15

Ala Gln Ala Gln Pro Gly Phe Lys Leu Val Gly Phe Lys Asn Phe Val
          20             25             30

Arg Thr Asn Pro Lys Ser Asp Arg Phe Gln Val Asn Arg Phe His His
          35             40             45

Ile Glu Phe Trp Cys Thr Asp Ala Thr Asn Ala Ser Arg Arg Phe Ser
          50             55             60

Trp Gly Leu Gly Met Pro Ile Val Ala Lys Ser Asp Leu Ser Thr Gly
          65             70             75             80

Asn Gln Ile His Ala Ser Tyr Leu Leu Arg Ser Gly Asp Leu Ser Phe
          85             90             95

Leu Phe Ser Ala Pro Tyr Ser Pro Ser Leu Ser Ala Gly Ser Ser Ala
          100            105            110

Ala Ser Ser Ala Ser Ile Pro Ser Phe Asp Ala Ala Thr Cys Leu Ala
          115            120            125

Phe Ala Ala Lys His Gly Phe Gly Val Arg Ala Ile Ala Leu Glu Val
          130            135            140

Ala Asp Ala Glu Ala Ala Phe Ser Ala Ser Val Ala Lys Gly Ala Glu
          145            150            155            160

Pro Ala Ser Pro Pro Val Leu Val Asp Asp Arg Thr Gly Phe Ala Glu
          165            170            175

Val Arg Leu Tyr Gly Asp Val Val Leu Arg Tyr Val Ser Tyr Lys Asp
          180            185            190

Ala Ala Pro Gln Ala Pro His Ala Asp Pro Ser Arg Trp Phe Leu Pro
          195            200            205

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Gly Phe Glu Ala Ala Ala Ser Ser Ser Ser Phe Pro Glu Leu Asp Tyr
 210 215 220
 Gly Ile Arg Arg Leu Asp His Ala Val Gly Asn Val Pro Glu Leu Ala
 225 230 235 240
 Pro Ala Val Arg Tyr Leu Lys Gly Phe Ser Gly Phe His Glu Phe Ala
 245 250 255
 Glu Phe Thr Ala Glu Asp Val Gly Thr Ser Glu Ser Gly Leu Asn Ser
 260 265 270
 Val Val Leu Ala Asn Asn Ser Glu Thr Val Leu Leu Pro Leu Asn Glu
 275 280 285
 Pro Val Tyr Gly Thr Lys Arg Lys Ser Gln Ile Glu Thr Tyr Leu Glu
 290 295 300
 His Asn Glu Gly Ala Gly Val Gln His Leu Ala Leu Val Thr His Asp
 305 310 315 320
 Ile Phe Thr Thr Leu Arg Glu Met Arg Lys Arg Ser Phe Leu Gly Gly
 325 330 335
 Phe Glu Phe Met Pro Ser Pro Pro Pro Thr Tyr Tyr Ala Asn Leu His
 340 345 350
 Asn Arg Ala Ala Asp Val Leu Thr Val Asp Gln Ile Lys Gln Cys Glu
 355 360 365
 Glu Leu Gly Ile Leu Val Asp Arg Asp Asp Gln Gly Thr Leu Leu Gln
 370 375 380
 Ile Phe Thr Lys Pro Val Gly Asp Arg Pro Thr Ile Phe Ile Glu Ile
 385 390 395 400
 Ile Gln Arg Ile Gly Cys Met Val Glu Asp Glu Glu Gly Lys Val Tyr
 405 410 415
 Gln Lys Gly Ala Cys Gly Gly Phe Gly Lys Gly Asn Phe Ser Glu Leu
 420 425 430
 Phe Lys Ser Ile Glu Glu Tyr Glu Lys Thr Leu Glu Ala Lys Arg Thr
 435 440 445

Ala

<210> 37
 <211> 1614
 <212> DNA
 <213> Triticum aestivum

<400> 37
 gcacgagcaa gaagcgaaca cacaccatgc cgcccccccc caccaccccc gcagccaccg 60
 gcgccgcgcg ggtgacgccg gagcacgcgc ggccgcgcgc aatggtccgc ttcaaccgcg 120
 gcagcgaccg cttccacacg ctgccttcc accacgtcga gttctggtgc gcggacgccg 180
 cctccgcgcg cgcccgcttc gccttcgcgc tcggcgcgcc gctcgccgcc aggtccgacc 240
 tctccacggg gaactccgtg cagcctccc agctgtccg ctcgggcaac ctcgccttcc 300
 tcttcacggc cccctacgcc aacggctgcg acgcgcgcc acgcctccctg ccctccttct 360

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ccgccgacgc cgcgcgccag ttctccgcgg accacggcct cgcggtgcgc tccatagcgc 420
tgcgcgctgc ggacgctgcc gaggccttcc gcgccagcgt cgacgggggc gcgcgcccg 480
ccttcagccc tgtggacctc ggccgcggct tcggcttcgc ggaggtcgag ctctacggcg 540
acgtcgtgct ccgcttcgtc agccaccggg acggcaggga cgtgcccttc ttgccgggg 600
tcgaggcggt gagcaaccca gacgcggtgg actacggcct gacgcggttc gaccacgtcg 660
tcggcaacgt cccggagctt gccccgcgg cgccctacgt cgccgggttc acgggggttc 720
acgagttcgc cgagttcacg acggaggacg tgggcacggc cgagagcggg ctcaactcga 780
tggtgctcgc caacaactcg gagggcgtgc tgctgccgct caacgagccg gtgcacggca 840
ccaagcggcg gagccagata cagacgttcc tggaacacca cgcggtctcg ggcgtgcagc 900
acatcgcggt ggccagcagc gacgtgctca ggacgctcag ggagatgcgt gcgcgctccg 960
ccatggggcg cttcgacttc ctgccacccc cgctgccgaa gtactacgaa ggcgtgcggc 1020
gcacgcggcg ggatgtgctc tcggaggcgc agatcaagga atgccaggag ctgggggtgc 1080
tcgtcgacag ggacgaccaa ggggtgttgc taaaaatctt caccaagcca gtaggggaca 1140
ggccgacggt gttcctggag atgatccaga ggatcgggtg catggagaag gacgagagag 1200
gggaagagta ccagaagggt ggctgcggcg ggctcggcaa aggcaacttc tccgagctgt 1260
tcaagtccat tgaagattac gagaagtccc ttgaagccaa gcaatctgct gcagttcagg 1320
gatcatagga tagaagctgg agctggagga gctgatccag tactttgtat caggtctcat 1380
ggagcaaaaag aaaatgatgt tgtttgtaag atgcggcgcg caattatgtc cgatgttata 1440
attggtgaag ctgaagacag atgtatccta tgtatgatgg gtgtaataga tggtagaggg 1500
ggctcggctc acacatgaac aaaatgtact gttggcattg ttgtataatc ttgcttgcaa 1560
gtaaaataaa gaagaaccga ttttgagttc tgcataaaaa aaaaaaaaaa aaaa 1614

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<210> 38
 <211> 433
 <212> PRT
 <213> *Triticum aestivum*

<400> 38
 Met Pro Pro Thr Pro Thr Thr Pro Ala Ala Thr Gly Ala Ala Ala Val
 1 5 10 15
 Thr Pro Glu His Ala Arg Pro Arg Arg Met Val Arg Phe Asn Pro Arg
 20 25 30
 Ser Asp Arg Phe His Thr Leu Ala Phe His His Val Glu Phe Trp Cys
 35 40 45
 Ala Asp Ala Ala Ser Ala Ala Gly Arg Phe Ala Phe Ala Leu Gly Ala
 50 55 60
 Pro Leu Ala Ala Arg Ser Asp Leu Ser Thr Gly Asn Ser Val His Ala
 65 70 75 80
 Ser Gln Leu Leu Arg Ser Gly Asn Leu Ala Phe Leu Phe Thr Ala Pro
 85 90 95
 Tyr Ala Asn Gly Cys Asp Ala Ala Thr Ala Ser Leu Pro Ser Phe Ser
 100 105 110
 Ala Asp Ala Ala Arg Gln Phe Ser Ala Asp His Gly Leu Ala Val Arg
 115 120 125
 Ser Ile Ala Leu Arg Val Ala Asp Ala Ala Glu Ala Phe Arg Ala Ser
 130 135 140
 Val Asp Gly Gly Ala Arg Pro Ala Phe Ser Pro Val Asp Leu Gly Arg
 145 150 155 160
 Gly Phe Gly Phe Ala Glu Val Glu Leu Tyr Gly Asp Val Val Leu Arg
 165 170 175

Phe Val Ser His Pro Asp Gly Arg Asp Val Pro Phe Leu Pro Gly Phe
 180 185 190
 Glu Gly Val Ser Asn Pro Asp Ala Val Asp Tyr Gly Leu Thr Arg Phe
 195 200 205
 Asp His Val Val Gly Asn Val Pro Glu Leu Ala Pro Ala Ala Ala Tyr
 210 215 220
 Val Ala Gly Phe Thr Gly Phe His Glu Phe Ala Glu Phe Thr Thr Glu
 225 230 235 240
 Asp Val Gly Thr Ala Glu Ser Gly Leu Asn Ser Met Val Leu Ala Asn
 245 250 255
 Asn Ser Glu Gly Val Leu Leu Pro Leu Asn Glu Pro Val His Gly Thr
 260 265 270
 Lys Arg Arg Ser Gln Ile Gln Thr Phe Leu Glu His His Gly Gly Ser
 275 280 285
 Gly Val Gln His Ile Ala Val Ala Ser Ser Asp Val Leu Arg Thr Leu
 290 295 300
 Arg Glu Met Arg Ala Arg Ser Ala Met Gly Gly Phe Asp Phe Leu Pro
 305 310 315 320
 Pro Pro Leu Pro Lys Tyr Tyr Glu Gly Val Arg Arg Ile Ala Gly Asp
 325 330 335
 Val Leu Ser Glu Ala Gln Ile Lys Glu Cys Gln Glu Leu Gly Val Leu
 340 345 350
 Val Asp Arg Asp Asp Gln Gly Val Leu Leu Gln Ile Phe Thr Lys Pro
 355 360 365
 Val Gly Asp Arg Pro Thr Leu Phe Leu Glu Met Ile Gln Arg Ile Gly
 370 375 380
 Cys Met Glu Lys Asp Glu Arg Gly Glu Glu Tyr Gln Lys Gly Gly Cys
 385 390 395 400
 Gly Gly Phe Gly Lys Gly Asn Phe Ser Glu Leu Phe Lys Ser Ile Glu
 405 410 415
 Asp Tyr Glu Lys Ser Leu Glu Ala Lys Gln Ser Ala Ala Val Gln Gly
 420 425 430

Ser

<210> 39

<211> 317

<212> PRT

<213> Synechocystis-sp.

<400> 39

Met Val Tyr His Val Arg Pro Lys His Ala Leu Phe Leu Ala Phe Tyr
 1 5 10 15

Cys Tyr Phe Ser Leu Leu Thr Met Ala Ser Ala Thr Ile Ala Ser Ala
 20 25 30
 Asp Leu Tyr Glu Lys Ile Lys Asn Phe Tyr Asp Asp Ser Ser Gly Leu
 35 40 45
 Trp Glu Asp Val Trp Gly Glu His Met His His Gly Tyr Tyr Gly Pro
 50 55 60
 His Gly Thr Tyr Arg Ile Asp Arg Arg Gln Ala Gln Ile Asp Leu Ile
 65 70 75 80
 Lys Glu Leu Leu Ala Trp Ala Val Pro Gln Asn Ser Ala Lys Pro Arg
 85 90 95
 Lys Ile Leu Asp Leu Gly Cys Gly Ile Gly Gly Ser Ser Leu Tyr Leu
 100 105 110
 Ala Gln Gln His Gln Ala Glu Val Met Gly Ala Ser Leu Ser Pro Val
 115 120 125
 Gln Val Glu Arg Ala Gly Glu Arg Ala Arg Ala Leu Gly Leu Gly Ser
 130 135 140
 Thr Cys Gln Phe Gln Val Ala Asn Ala Leu Asp Leu Pro Phe Ala Ser
 145 150 155 160
 Asp Ser Phe Asp Trp Val Trp Ser Leu Glu Ser Gly Glu His Met Pro
 165 170 175
 Asn Lys Ala Gln Phe Leu Gln Glu Ala Trp Arg Val Leu Lys Pro Gly
 180 185 190
 Gly Arg Leu Ile Leu Ala Thr Trp Cys His Arg Pro Ile Asp Pro Gly
 195 200 205
 Asn Gly Pro Leu Thr Ala Asp Glu Arg Arg His Leu Gln Ala Ile Tyr
 210 215 220
 Asp Val Tyr Cys Leu Pro Tyr Val Val Ser Leu Pro Asp Tyr Glu Ala
 225 230 235 240
 Ile Ala Arg Glu Cys Gly Phe Gly Glu Ile Lys Thr Ala Asp Trp Ser
 245 250 255
 Val Ala Val Ala Pro Phe Trp Asp Arg Val Ile Glu Ser Ala Phe Asp
 260 265 270
 Pro Arg Val Leu Trp Ala Leu Gly Gln Ala Gly Pro Lys Ile Ile Asn
 275 280 285
 Ala Ala Leu Cys Leu Arg Leu Met Lys Trp Gly Tyr Glu Arg Gly Leu
 290 295 300
 Val Arg Phe Gly Leu Leu Thr Gly Ile Lys Pro Leu Val
 305 310 315

<210> 40
 <211> 348

<212> PRT

<213> Arabidopsis thaliana

<400> 40

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Met Lys Ala Thr Leu Ala Ala Pro Ser Ser Leu Thr Ser Leu Pro Tyr
 1           5           10           15
Arg Thr Asn Ser Ser Phe Gly Ser Lys Ser Ser Leu Leu Phe Arg Ser
          20           25           30
Pro Ser Ser Ser Ser Ser Val Ser Met Thr Thr Thr Arg Gly Asn Val
          35           40           45
Ala Val Ala Ala Ala Ala Thr Ser Thr Glu Ala Leu Arg Lys Gly Ile
          50           55           60
Ala Glu Phe Tyr Asn Glu Thr Ser Gly Leu Trp Glu Glu Ile Trp Gly
          65           70           75           80
Asp His Met His His Gly Phe Tyr Asp Pro Asp Ser Ser Val Gln Leu
          85           90           95
Ser Asp Ser Gly His Lys Glu Ala Gln Ile Arg Met Ile Glu Glu Ser
          100          105          110
Leu Arg Phe Ala Gly Val Thr Asp Glu Glu Glu Glu Lys Lys Ile Lys
          115          120          125
Lys Val Val Asp Val Gly Cys Gly Ile Gly Gly Ser Ser Arg Tyr Leu
          130          135          140
Ala Ser Lys Phe Gly Ala Glu Cys Ile Gly Ile Thr Leu Ser Pro Val
          145          150          155          160
Gln Ala Lys Arg Ala Asn Asp Leu Ala Ala Ala Gln Ser Leu Ser His
          165          170          175
Lys Ala Ser Phe Gln Val Ala Asp Ala Leu Asp Gln Pro Phe Glu Asp
          180          185          190
Gly Lys Phe Asp Leu Val Trp Ser Met Glu Ser Gly Glu His Met Pro
          195          200          205
Asp Lys Ala Lys Phe Val Lys Glu Leu Val Arg Val Ala Ala Pro Gly
          210          215          220
Gly Arg Ile Ile Ile Val Thr Trp Cys His Arg Asn Leu Ser Ala Gly
          225          230          235          240
Glu Glu Ala Leu Gln Pro Trp Glu Gln Asn Ile Leu Asp Lys Ile Cys
          245          250          255
Lys Thr Phe Tyr Leu Pro Ala Trp Cys Ser Thr Asp Asp Tyr Val Asn
          260          265          270
Leu Leu Gln Ser His Ser Leu Gln Asp Ile Lys Cys Ala Asp Trp Ser
          275          280          285
Glu Asn Val Ala Pro Phe Trp Pro Ala Val Ile Arg Thr Ala Leu Thr
          290          295          300

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Trp Lys Gly Leu Val Ser Leu Leu Arg Ser Gly Met Lys Ser Ile Lys
305 310 315 320

Gly Ala Leu Thr Met Pro Leu Met Ile Glu Gly Tyr Lys Lys Gly Val
325 330 335

Ile Lys Phe Gly Ile Ile Thr Cys Gln Lys Pro Leu
340 345

<210> 41

<211> 434

<212> PRT

<213> Hordeum vulgare

<400> 41

Met Pro Pro Thr Pro Thr Thr Pro Ala Ala Thr Gly Ala Ala Ala Ala
1 5 10 15

Val Thr Pro Glu His Ala Arg Pro His Arg Met Val Arg Phe Asn Pro
20 25 30

Arg Ser Asp Arg Phe His Thr Leu Ser Phe His His Val Glu Phe Trp
35 40 45

Cys Ala Asp Ala Ala Ser Ala Ala Gly Arg Phe Ala Phe Ala Leu Gly
50 55 60

Ala Pro Leu Ala Ala Arg Ser Asp Leu Ser Thr Gly Asn Ser Ala His
65 70 75 80

Ala Ser Gln Leu Leu Arg Ser Gly Ser Leu Ala Phe Leu Phe Thr Ala
85 90 95

Pro Tyr Ala Asn Gly Cys Asp Ala Ala Thr Ala Ser Leu Pro Ser Phe
100 105 110

Ser Ala Asp Ala Ala Arg Arg Phe Ser Ala Asp His Gly Ile Ala Val
115 120 125

Arg Ser Val Ala Leu Arg Val Ala Asp Ala Ala Glu Ala Phe Arg Ala
130 135 140

Ser Arg Arg Arg Gly Ala Arg Pro Ala Phe Ala Pro Val Asp Leu Gly
145 150 155 160

Arg Gly Phe Ala Phe Ala Glu Val Glu Leu Tyr Gly Asp Val Val Leu
165 170 175

Arg Phe Val Ser His Pro Asp Gly Thr Asp Val Pro Phe Leu Pro Gly
180 185 190

Phe Glu Gly Val Thr Asn Pro Asp Ala Val Asp Tyr Gly Leu Thr Arg
195 200 205

~~Phe Asp His Val Val Gly Asn Val Pro Glu Leu Ala Pro Ala Ala Ala~~
~~210 215 220~~

Tyr Ile Ala Gly Phe Thr Gly Phe His Glu Phe Ala Glu Phe Thr Ala
225 230 235 240

Glu Asp Val Gly Thr Thr Glu Ser Gly Leu Asn Ser Val Val Leu Ala
 245 250 255
 Asn Asn Ser Glu Gly Val Leu Leu Pro Leu Asn Glu Pro Val His Gly
 260 265 270
 Thr Lys Arg Arg Ser Gln Ile Gln Thr Phe Leu Glu His His Gly Gly
 275 280 285
 Pro Gly Val Gln His Ile Ala Val Ala Ser Ser Asp Val Leu Arg Thr
 290 295 300
 Leu Arg Lys Met Arg Ala Arg Ser Ala Met Gly Gly Phe Asp Phe Leu
 305 310 315 320
 Pro Pro Pro Leu Pro Lys Tyr Tyr Glu Gly Val Arg Arg Leu Ala Gly
 325 330 335
 Asp Val Leu Ser Glu Ala Gln Ile Lys Glu Cys Gln Glu Leu Gly Val
 340 345 350
 Leu Val Asp Arg Asp Asp Gln Gly Val Leu Leu Gln Ile Phe Thr Lys
 355 360 365
 Pro Val Gly Asp Arg Pro Thr Leu Phe Leu Glu Met Ile Gln Arg Ile
 370 375 380
 Gly Cys Met Glu Lys Asp Glu Arg Gly Glu Glu Tyr Gln Lys Gly Gly
 385 390 395 400
 Cys Gly Gly Phe Gly Lys Gly Asn Phe Ser Glu Leu Phe Lys Ser Ile
 405 410 415
 Glu Asp Tyr Glu Lys Ser Leu Glu Ala Lys Gln Ser Ala Ala Val Gln
 420 425 430

Gly Ser

<210> 42
 <211> 442
 <212> PRT
 <213> Daucus carota

<400> 42
 Met Gly Lys Lys Gln Ser Glu Ala Glu Ile Leu Ser Ser Asn Ser Ser
 1 5 10 15
 Asn Thr Ser Pro Ala Thr Phe Lys Leu Val Gly Phe Asn Asn Phe Val
 20 25 30
 Arg Ala Asn Pro Lys Ser Asp His Phe Ala Val Lys Arg Phe His His
 35 40 45
 Ile Glu Phe Trp Cys Gly Asp Ala Thr Asn Thr Ser Arg Arg Phe Ser
 50 55 60
 Trp Gly Leu Gly Met Pro Leu Val Ala Lys Ser Asp Leu Ser Thr Gly
 65 70 75 80

Asn Ser Val His Ala Ser Tyr Leu Val Arg Ser Ala Asn Leu Ser Phe
 85 90 95
 Val Phe Thr Ala Pro Tyr Ser Pro Ser Thr Thr Thr Ser Ser Gly Ser
 100 105 110
 Ala Ala Ile Pro Ser Phe Ser Ala Ser Gly Phe His Ser Phe Ala Ala
 115 120 125
 Lys His Gly Leu Ala Val Arg Ala Ile Ala Leu Glu Val Ala Asp Val
 130 135 140
 Ala Ala Ala Phe Glu Ala Ser Val Ala Arg Gly Ala Arg Pro Ala Ser
 145 150 155 160
 Ala Pro Val Glu Leu Asp Asp Gln Ala Trp Leu Ala Glu Val Glu Leu
 165 170 175
 Tyr Gly Asp Val Val Leu Arg Phe Val Ser Phe Gly Arg Glu Glu Gly
 180 185 190
 Leu Phe Leu Pro Gly Phe Glu Ala Val Glu Gly Thr Ala Ser Phe Pro
 195 200 205
 Asp Leu Asp Tyr Gly Ile Arg Arg Leu Asp His Ala Val Gly Asn Val
 210 215 220
 Thr Glu Leu Gly Pro Val Val Glu Tyr Ile Lys Gly Phe Thr Gly Phe
 225 230 235 240
 His Glu Phe Ala Glu Phe Thr Ala Glu Asp Val Gly Thr Leu Glu Ser
 245 250 255
 Gly Leu Asn Ser Val Val Leu Ala Asn Asn Glu Glu Met Val Leu Leu
 260 265 270
 Pro Leu Asn Glu Pro Val Tyr Gly Thr Lys Arg Lys Ser Gln Ile Gln
 275 280 285
 Thr Tyr Leu Glu His Asn Glu Gly Ala Gly Val Gln His Leu Ala Leu
 290 295 300
 Val Ser Glu Asp Ile Phe Arg Thr Leu Arg Glu Met Arg Lys Arg Ser
 305 310 315 320
 Cys Leu Gly Gly Phe Glu Phe Met Pro Ser Pro Pro Pro Thr Tyr Tyr
 325 330 335
 Lys Asn Leu Lys Asn Arg Val Gly Asp Val Leu Ser Asp Glu Gln Ile
 340 345 350
 Lys Glu Cys Glu Asp Leu Gly Ile Leu Val Asp Arg Asp Asp Gln Gly
 355 360 365
 Thr Leu Leu Gln Ile Phe Thr Lys Pro Val Gly Asp Arg Pro Thr Leu
 370 375 380
 Phe Ile Glu Ile Ile Gln Arg Val Gly Cys Met Leu Lys Asp Asp Ala
 385 390 395 400

Gly Gln Met Tyr Gln Lys Gly Gly Cys Gly Gly Phe Gly Lys Gly Asn
405 410 415

Phe Ser Glu Leu Phe Lys Ser Ile Glu Glu Tyr Glu Lys Thr Leu Glu
420 425 430

Ala Lys Gln Ile Thr Gly Ser Ala Ala Ala
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<211> 445

<212> PRT

<213> Arabidopsis thaliana

<400> 43

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20 25 30

Val Arg Lys Asn Pro Lys Ser Asp Lys Phe Lys Val Lys Arg Phe His
35 40 45

His Ile Glu Phe Trp Cys Gly Asp Ala Thr Asn Val Ala Arg Arg Phe
50 55 60

Ser Trp Gly Leu Gly Met Arg Phe Ser Ala Lys Ser Asp Leu Ser Thr
65 70 75 80

Gly Asn Met Val His Ala Ser Tyr Leu Leu Thr Ser Gly Asp Leu Arg
85 90 95

Phe Leu Phe Thr Ala Pro Tyr Ser Pro Ser Leu Ser Ala Gly Glu Ile
100 105 110

Lys Pro Thr Thr Thr Ala Ser Ile Pro Ser Phe Asp His Gly Ser Cys
115 120 125

Arg Ser Phe Phe Ser Ser His Gly Leu Gly Val Arg Ala Val Ala Ile
130 135 140

Glu Val Glu Asp Ala Glu Ser Ala Phe Ser Ile Ser Val Ala Asn Gly
145 150 155 160

Ala Ile Pro Ser Ser Pro Pro Ile Val Leu Asn Glu Ala Val Thr Ile
165 170 175

Ala Glu Val Lys Leu Tyr Gly Asp Val Val Leu Arg Tyr Val Ser Tyr
180 185 190

Lys Ala Glu Asp Thr Glu Lys Ser Glu Phe Leu Pro Gly Phe Glu Arg
195 200 205

Val Glu Asp Ala Ser Ser Phe Pro Leu Asp Tyr Gly Ile Arg Arg Leu
210 215 220

Asp His Ala Val Gly Asn Val Pro Glu Leu Gly Pro Ala Leu Thr Tyr
225 230 235 240

Val Ala Gly Phe Thr Gly Phe His Gln Phe Ala Glu Phe Thr Ala Asp
 245 250 255
 Asp Val Gly Thr Ala Glu Ser Gly Leu Asn Ser Ala Val Leu Ala Ser
 260 265 270
 Asn Asp Glu Met Val Leu Leu Pro Ile Asn Glu Pro Val His Gly Thr
 275 280 285
 Lys Arg Lys Ser Gln Ile Gln Thr Tyr Leu Glu His Asn Glu Gly Ala
 290 295 300
 Gly Leu Gln His Leu Ala Leu Met Ser Glu Asp Ile Phe Arg Thr Leu
 305 310 315 320
 Arg Glu Met Arg Lys Arg Ser Ser Ile Gly Gly Phe Asp Phe Met Pro
 325 330 335
 Ser Pro Pro Pro Thr Tyr Tyr Gln Asn Leu Lys Lys Arg Val Gly Asp
 340 345 350
 Val Leu Ser Asp Asp Gln Ile Lys Glu Cys Glu Glu Leu Gly Ile Leu
 355 360 365
 Val Asp Arg Asp Asp Gln Gly Thr Leu Leu Gln Ile Phe Thr Lys Pro
 370 375 380
 Leu Gly Asp Arg Pro Thr Ile Phe Ile Glu Ile Ile Gln Arg Val Gly
 385 390 395 400
 Cys Met Met Lys Asp Glu Glu Gly Lys Ala Tyr Gln Ser Gly Gly Cys
 405 410 415
 Gly Gly Phe Gly Lys Gly Asn Phe Ser Glu Leu Phe Lys Ser Ile Glu
 420 425 430
 Glu Tyr Glu Lys Thr Leu Glu Ala Lys Gln Leu Val Gly
 435 440 445